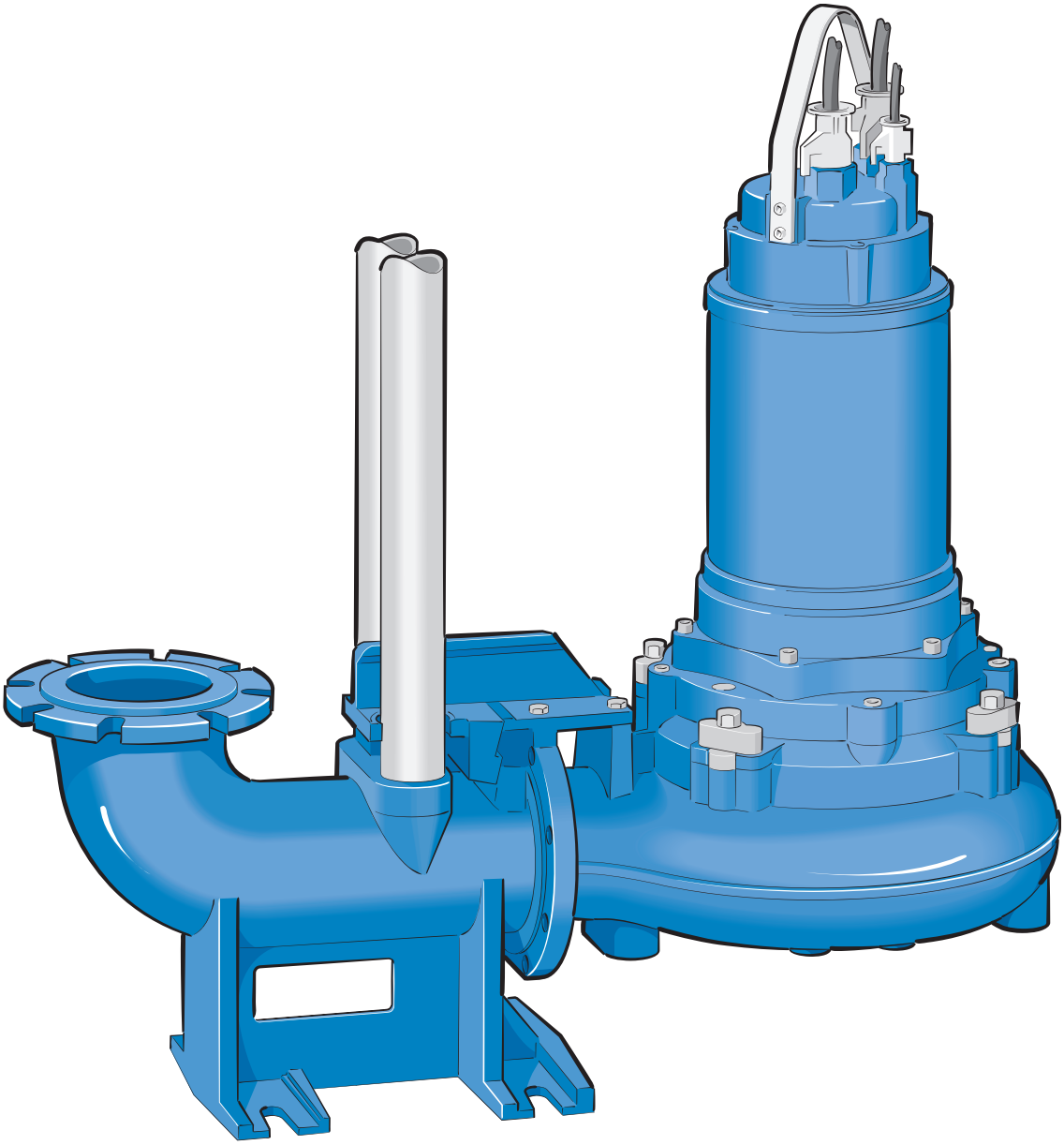
PUMPEX

K 89, 103, 153.58.0404.Eng/Digital

K 89, 103, 153

SERVICE INSTRUCTION



SERVICE INSTRUCTION

K 89, 103, 153

K 89, 103, 153.58.0404.Eng/Digital

This service manual covers the pumps K89, K 103 and K 153 in following designs:

Type F Wet Pit Installation

Installed on a guide rail system with a quick-release base elbow, the base elbow is bolted to the floor of the sump. The volute is equipped with an adapter to be connected to the discharge elbow. Two twin guide rails are mounted to the discharge elbow to steer the pump into right position when hoisted up and down.

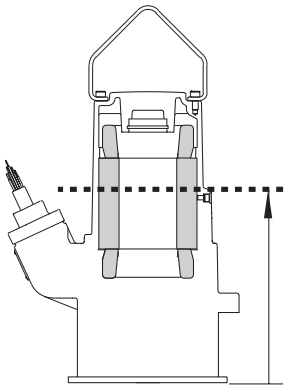
Type T, Dry Pit Installation

Installed in a normally dry well, but still fully submersible. The pump is supported by an adjustable fabricated steel stand, mounted at the factory. The height of the stand is sufficient for the standard suction elbow to be used on a flat floor. The pump volute is drilled or threaded on the connection-flange and equipped with studs on the suction flange. The motors are equipped with a maintenance-free internal, closed loop cooling system which dissipates the heat to the liquid that is being pumped.

Type P, Wet Pit Portable or fixed installation

A version of pump which is suitable for temporary or permanent installations. The pump is equipped with a fabricated steel stand and either a threaded (BSP, NPT) or plain hose connection. The motor can if required, be equipped with a maintenance-free internal, closed loop cooling system which dissipates the heat to the liquid that is being pumped.

When installed without a cooling jacket, the minimum water level in the wet well for continuous operation should not be below the top edge of the pump house. Intermittent operation down to a water level above half the height of the stator is acceptable, see picture. For continuous operation at water levels below the top edge of the pump house, an internal cooling jacket is recommended.



The pumps are divided into three categories: Standard, Ex and Fm. The difference between the three is the wear plate. In the standard version there is a hole drilled for the moisture switch. On the Ex there is no hole and the Fm version has a threaded hole.

The Volute

The volutes are equipped with adjustable wear rings as standard. The volute on the K89 is only available in the Vortex impeller design and has got no wear rings.

CE PUMPEX					
▽ 20 m	K 80	①			
No 99999999		②	P.2	2.0 kW ⑤	3 Ph 50 Hz ⑦
U 400 V Y		③	n 1385 rpm	⑥	Class F IP68 ⑧
I 5,4 A		④			98 kg ⑨
PUMPEX Box 5207 S - 12116 JOHANNESHOV SWEDEN					

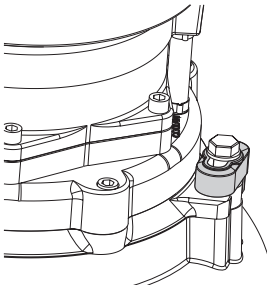
1 Type of pump
2 Serial number
3 Working voltage
4 Rated current
5 Rated output
6 Engine speed
7 Frequency
8 Winding class
9 Weight

SERVICE INSTRUCTION
K 89, 103, 153

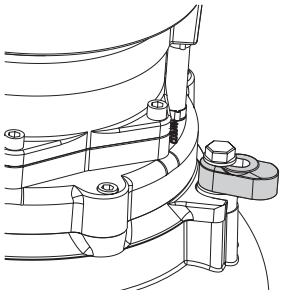
K 89, 103, 153.58.0404.Eng/Digital

Warning !
The pump and its electrical cables must be disconnected from any power source by a qualified electrician before any inspection or service is performed!

Removal from the wet well
Hoist the pump from the sump and rinse clean.



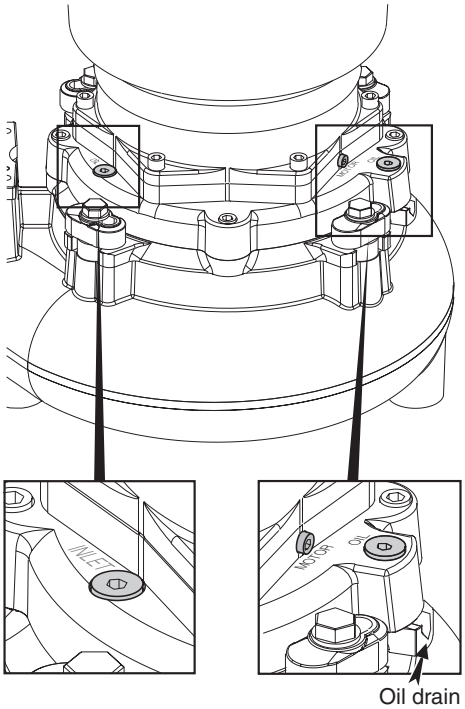
Disassembling the volute
The rotating element is connected to the volute with four latch bolts. Loosen the locking screws and turn the latch bolts 90°. Lift out the rotating element from the volute.



Changing the oil
Remove the plug marked ”outlet” and let the old oil pour out through the groove under the plug. Discard of any used oil in accordance with local regulations. Fasten the plug so that the lower but not the top O-ring gasket seals.

Oil: white oil (Enerpar M002, or similar).
Oil amount: 1.5 dl.

Inspect the motor housing by removing the screw marked ”motor”. Tilt the pump slightly. If water, oil or other debris is present in the motor housing, a full dismantling is required.



Changing the cooling liquid

Pump without cooling jacket:
Loosen the cooling liquid plug down on the oil housing. Open the plugs on top of the oil housing and let the old water can pour out.

Replug the lower plug on the oil housing. Slowly fill the new cooling liquid into one of the holes on top of the oil housing. Let both plugs on the top be open to avoid air bubbles to obstruct the filling.

Note! Don´t forget to tighten the plugs after completed filling.

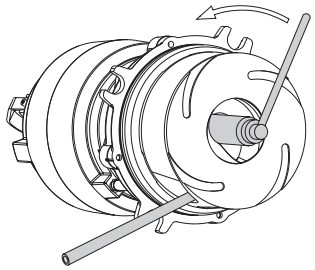
Cooling liquid, quantity (l): 4,0
(30% Propylene glycol DOWCAL ® 20)

Pump with cooling jacket:
Loosen the cooling liquid plug down on the oil housing. Open the plug on top of the cooling jacket and let the old water can pour out.

Replug the lower plug on the oil housing. Slowly fill the new cooling liquid into the hole on top of the cooling jacket.

Note! Don´t forget to tighten the plugs after completed filling.

Cooling liquid, quantity (l): 11,0
(30% Propylene glycol DOWCAL ® 20)



Disassembling the impeller
The impeller is bolted to the shaft with a washer and a bolt. Securing the impeller, remove the impeller bolt with a wrench.

Disassembling the seal cartridge
Disassemble volute and impeller as above, and empty the motor of cooling liquid and oil. Lay the rotating element on its side. Remove the four screws that holds the seal cartridge. The cartridge can be removed from the oil chamber by inserting the set screws into the "jacking holes" in the cartridge, which will force the cartridge from the housing.

Disassembling the connection cover
Remove the four screws that holds the cover. Gently lift the cover to gain access to the terminal board area.

Note! Remember the order of the colours connected on the terminal board.

Disassembling the cooling jacket
Disassemble the connection cover as above. Remove the four screws that holds the jacket and lift it off.

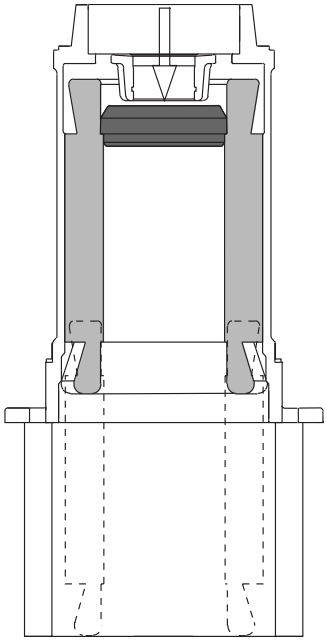
Changing the stator unit
If the motor protection trips repeatedly, the stator has to be overhauled. Disassemble the cable cover with the motor cable. Check the isolation resistance with a megger. If measuring with a 500 V megger the isolation resistance shall exceed 1 mega-ohm. This applies to phase to phase readings, as well as between each phase to ground. If the isolation resistance is less than 1 megaohm the stator should be cleaned and baked in an oven. Also check the circuit with the three built-in thermal overload switches using a buzzer or a bell.

If the isolation resistance is less than 1 megaohm the stator has to be checked. Disconnect the pump from the electric box.

Check the isolation resistance of the motor at the loose end of the cable. Use a megger. If using a 500 V megger the isolation resistance shall exceed 1 megaohm. phase to phase readings as well as between each phase to ground.

If any problems occurs, disconnect the cable from the stator and measure directly at the stator. If the isolation resistance is less than 1 megaohm the stator should be dried in an oven. If the circuit is open, probably one of the overload switches is defective and should be located by testing each one.

The defective switch is bypassed according to the adjoining connection scheme. If the stator still can´t be used it has to be replaced. Disconnect the stator from the outgoing cables and disassemble it. Order a exchange stator unit from the nearest Pumpex Service Center.



Disassembling the stator

Remove the four screws that holds the stator casing. Gently, with a hoist, lift the stator casing from the shaft. Disasssemble the coupling cover and remove the connection plate. Put the stator unit on a distance tube. Take the pressure tool from withunder and put it on the stator. Push through the top bearing seat the stator out from the casing.

Note! Make a note of the measure from the lower edge of the stator housing to the edge of the stator, before the stator is pressed out.

Disassembling the rotor and bearings

The rotor is mounted in the oil chamber with an upper and lower bearing. Remove the four screws of the bearing house and loosen the house with a crowbar. Carefully lift out the rotor with the upper bearing from the oil housing.

Bearings that has been in contact with with water or that are damaged should **always** be replaced. Fasten the rotor in a vice with soft jaws. Clean the shaft and lubricate it. Place the withdrawing tool on the upper bearing and see to that it pulls the inner ring. If the lower bearing is on the shaft, pull it off with your hands. Pick up the lower bearing if it´s still left in the oil housing.

Assembling

Clean all O-ring grooves and all other contact surfaces carefully. Use a wire brush when necessary.

Lubricate all O-rings with oil or grease to prevent the O-rings from getting stuck or damaged when remounted. Also lubricate the threads on all the screws to facilitate disassembling when serviceing next time.

Mounting the bearings

Check that the shaft is straight and that the key way isn´t damaged. Polish eventual scratches and burrs off. Push the upper bearing into its place. If a press isn´t available, heat the bearing to 100-120° C in a oilbath.

Wipe off the shaft contacting surfaces of the bearing and mount it. Place the bearing cover on the shaft and mount the lower bearing by using only your hands. Don´t forget to refill the bearings with grease.

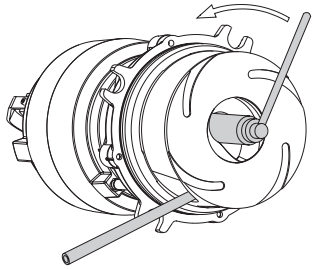
Mounting the rotor in the oil housing

Push the lower bearing into the bearing seat by pushing lightly with your hand at the end of the shaft. Lock the rotor by fastening the four screws of the bearing house.

Mounting the seal cartridge

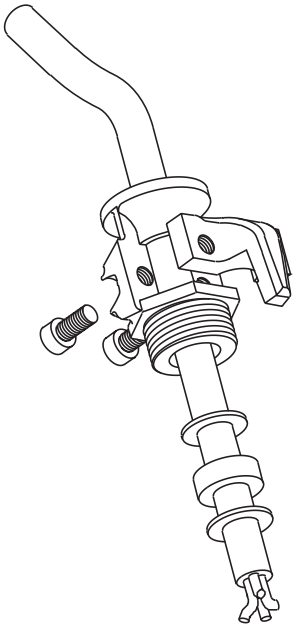
Put down the driving unit. Lubricate the shaftand all four O-rings on the seal unit (three external on the seal housing and one internal in the seal cap). Carefully push the seal unit onto the shaft, and place into position by aligning the screw holes. **Do not use hard striking tools.** Tighten the seal unit by fastening the four screws.

NOTE! Never run the motor without having the impeller mounted, if the seal is mounted. This can cause da-mage to O-rings in seal.



Mounting the impeller

Turn the shaft so that the key way is upward. Put the key in its groove and push the impeller onto the shaft. Lock the impeller from rotating with a pipe or similar and fasten the impeller washer and screw.

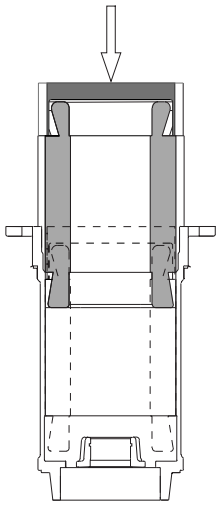


Mounting the cable seal

If water has gottenthrough the cable seal to the terminal board, the cable seals have to be replaced. The cable seal should be replaced after every disassembly of the cable gland. Measure the cable diameter with a slide gauge and compare it to the holes in the cable seal and the spacers so that the dimensions are alike.
Pull the seal onto the cable with one washer on each side. Pull the cable through the cover so that the cable with its cover extends through the cable gland an into the terminal area when tightening the cable lead-in. After tightening, the strain relief clamp is fastened. Turn the clip´s long pin down to prevent that the cable lead-in from unthreading.

Mounting the stator

Push the stator in with the pressure tool. **Note! Remember the measure from "Dismounting the stator".**



Pull the cables from the stator through the cable seals on the connection plate. Put the connection plate with O-ring in their place and connect the cables onto the terminal board according to the wiring diagram on page 9.

Mount the connection cover. Erect the oil housing and clean all contact surfaces between the oil housing and the stator unit with a wire brush. Lubricate and mount a new O-ring on the oil housing. The stator is now ready to be mounted on the oil housing. Lift the stator unit with a lift device and carefully lower it over the rotor. See to that the rotor does not damage the windings or the stator stick. Fasten the stator with its six screws. **Be sure to that the external markings are in line.**

Mounting the coupling cover

Keep the cover near the terminal board to not get the cables too long. Connect the cables according the wiring diagram on page 9. Remember that the ground cable by safety reasons should be longer than the other cables.

Before the cover is fastened, it should be turned one half turn to avoid having the cables pinched under the cap.
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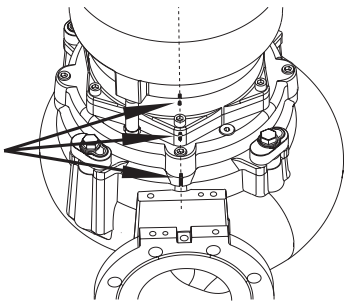


Mounting the cooling jacket

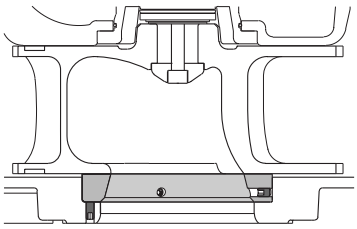
Put the two internal cooling tubes into position and fix with the external cooling pipe. Lower the cooling mantle over the stator casing and see to that the external markings are in line, and that the cooling pipes are in their right positions. Fasten the cooling jacket with four screws. See that the external markings are in line.

Mounting the rotating element to the volute

Turn the latch bolts so that the driving unit is free down to the upper edge of the volute. Turn the latch bolts in and fasten the screws alternately. See to that the external markings is in line. Tighten completely by hand using the wrench supplied by Pumpex. Once hand tightened, use a sledge hammer and tighten by another ¼ to ½ turn to assure a tight connection.

Adjusting the wear ring

Lay the pump down on its side and check the clearance inbetween impeller and wear ring. The clearance should be 0,7 mm maximum. The wear ring is placed on the bottom side of the volute and is fastened by three screws placed horizontally. Loosen these screws and adjust with the three vertically placed screws. When necessary strike carefully with a hammer or plastic club. When the distance is adjusted the horizontally placed screws can be tightened.



Note! This applies only if using channel impeller. If using vortex impeller do not adjust the wear ring!

The K89 does not have a wear ring due to the vortex design.

Testing

Connect the cables to the electric mains and start the pump. This should only be done by a qualified electrician. The arrow on the cover indicates the direction of rotation - clockwise, when viewed from the top of the motor. The starting reaction will be in the opposite direction.

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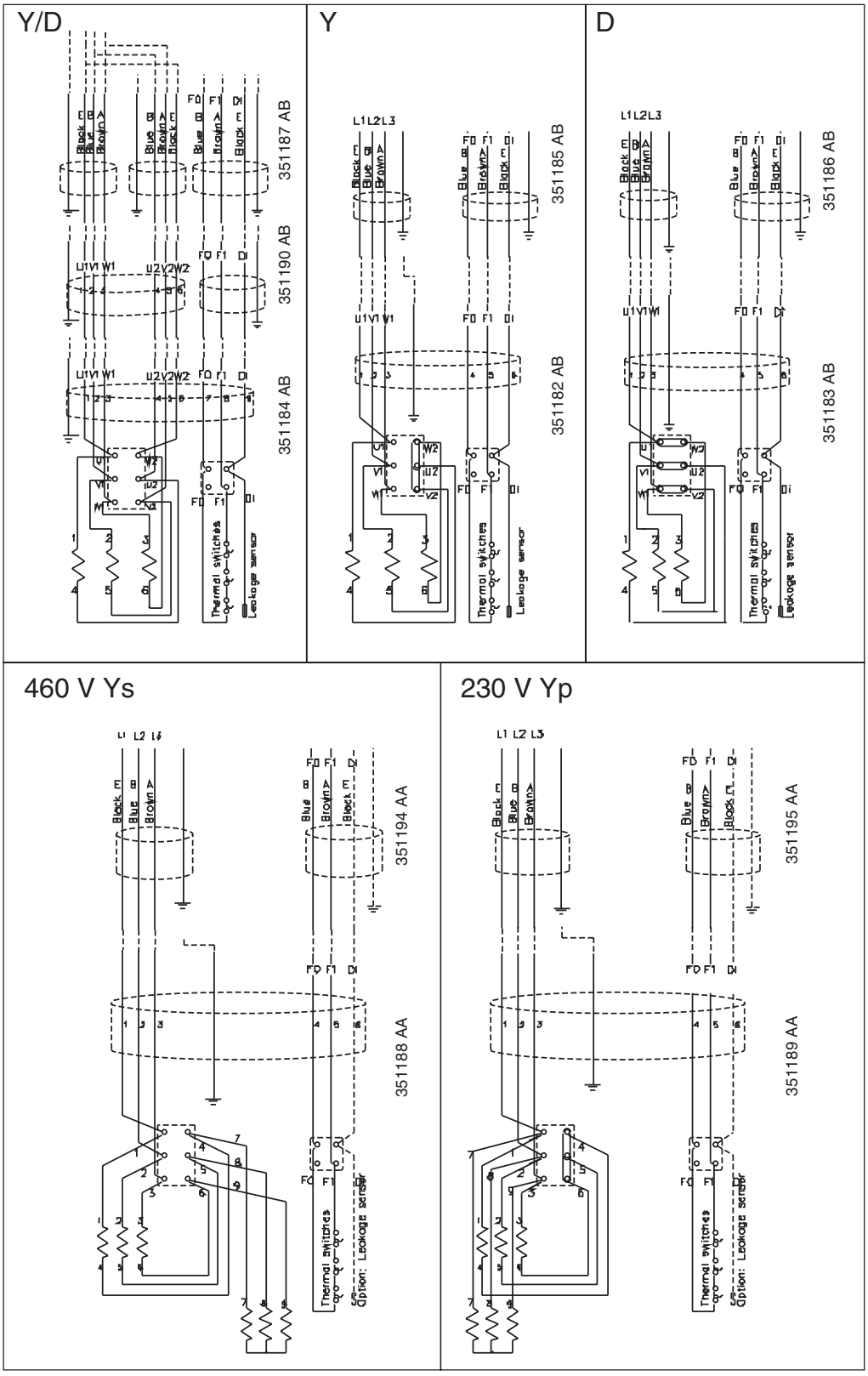
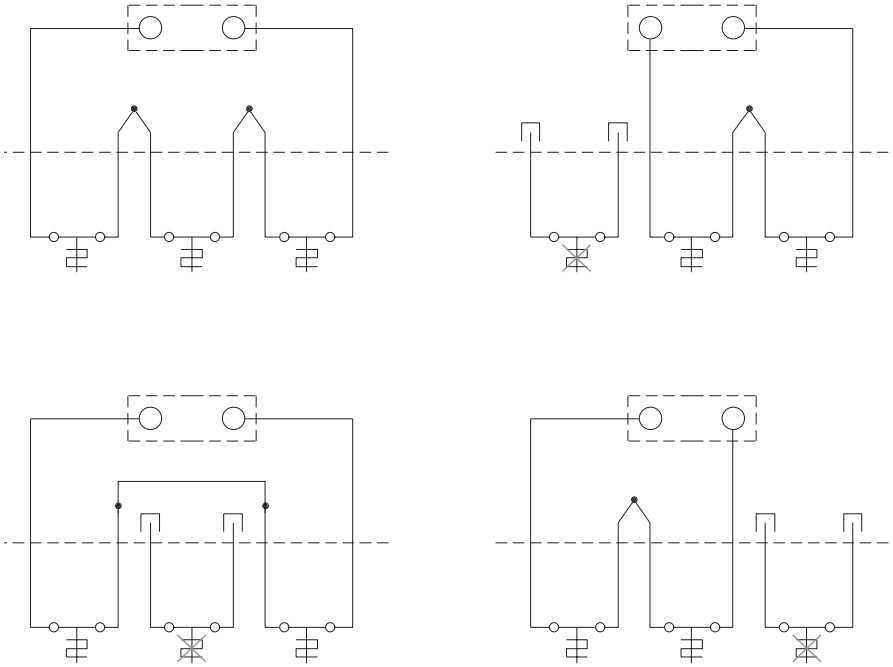
K 89, 103, 153

K 89, 103, 153.58.0404.Eng/Digital

Wiring diagram



Isolation resistance diagram



Tightening factor

Size	(Nm)
M6	7
M8	17
M10	33
M12	57
M14	91
M16	140

Size	(Nm)
Impeller bolt (M12 Bumax)	115
Latch bolt (M16 A4-80)	187

Cable gland: A specific estimation of the tightening factor can not be given for the cable gland. Tighten it until the rubber offers resistance, and thereafter one more full rotation.